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ZIYANM PA KA BOUT EN GWADLOUP - NEVER-ENDING YAMS IN GUADELOUPE
Agrobiodiversity use for labour-intensive and sustainable production of graded yam with the "gutter-type tuber-support-container

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Keywords: Yam (Dioscorea alata), cropping system, caliber, density

Abstract
Yam (Dioscorea spp) is an annual tuber crop which is an important food crops in intertropical diets. Its area of cultivation varies from Japan, Western Africa, to the Caribbean with a wide diversity of cropping systems and cultivars. Among them, the yam cropping system with the "gutter-type tuber-support-container" in Japan allows for a sustainable increase of the graded tuber production. The main objective of this preliminary study is to test the adaptation of this yam cropping system under our Caribbean conditions and to select cultivars adapted to this system. The experiment was set in 2015 on the INRA experimental station in Duclos where 7 cultivars of D. alata were planted in gutters with a high density. The use of the "gutter-type tuber-support-container" coupled to the use of compost and paper mulch can intensify in a sustainable way yam-based cropping systems while avoiding the use of chemicals (mineral fertilizers, herbicides...). First results are promising, especially for 2 cultivars from Vanuatu, called Wanorak and Nepelev, which show very good yields (50t.ha^{-1}) and grade (1 meter length for 1.4 kg in average per tuber). This type of cropping system could represent a sustainable alternative for local communities for instance. We still need to validate these results and to realize a technical-economical analysis of the performance of such system.

Figure 1: Cultivation of *Dioscorea alata* in gutters in Japan (Source : H. Shiwachi, Univ. de Tokyo)

Materials and methods

The experiment was set in 2015 at the INRA experimental station in Duclos (I6°12'N; 61°39›O; alt. 125 m), which is characterized by rainfall of 2500 mm.yr^{-1} and ferralsols. After plowing, yam sets of about 100 grams where planted at very high density (6 plants per m^2) in gutter-type containers with a diameter of 10 centimeters. Gutters were slightly tilted (5-10°) to facilitate tuber growth. They were then covered by a mixture of compost and soil, and paper mulch for weed control (Tournebize et al. 2012, Figure 2). The experiment is a complete randomized block design with 3 repetitions of 10 plants of each cultivar. The experimental plot was irrigated and fertilized with mineral fertilization (120N, 20P, 140K par ha) applied at planting. A total of seven cultivars of D. alata were planted the 24th of July 2015 including 3 local cultivars, 2 cultivars from the Biological Resource Centre for Tropical Plants and 2 cultivars from Vanuatu (Lebot 2002). Table 1 shows the cultivars' origins and names.

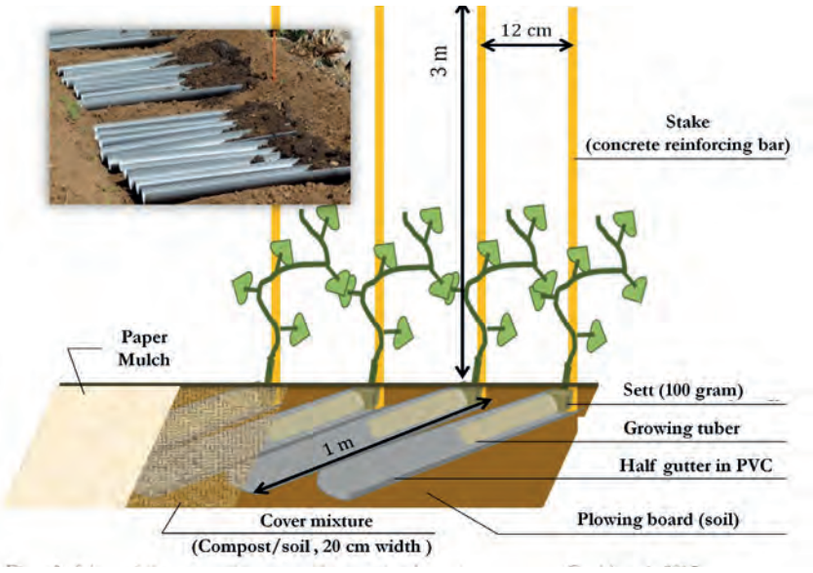

Figure 2: Schema of the yam cropping system with "gutter-type tuber-support-containers" Guadeloupe in 2015.

N° cultivar	Origin	Cultivar name
27	CRB[1]	Divin
56	CRB	DA_27
63	CRB	Ti Joseph
87	CRB	Anba Bon (Tahiti)
VU750	DARD[2]	Wanorak
VU755	DARD	Nepelev
614	CRB	Montpellier

[1] CRB : Biological Resource Centre Tropical Plants (Guadeloupe)
[2] DARD : Department of Agriculture and Rural Development (Vanuatu)

Table 1: Origin and name of tested cultivars

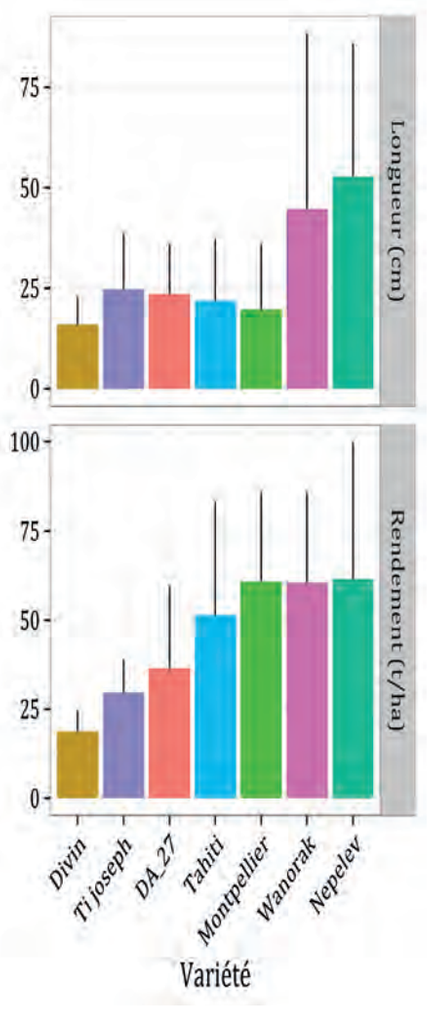

Figure 3: Comparison of grade and yield among cultivars

Main results :

First results are encouraging but show high cultivar differences in terms of yield and grade (Figure 3). Four cultivars show yields above 50 tons.ha^{-1}. However, no local cultivars tested show a good development in gutters. Only cultivars Wanorak and Nepelev, introduced by Cirad, show tubers with uniform sizes and grades (Figure 4).

Figure 4: Grade of the main cultivars tested in Duclos in 2015.

Conclusion

To our knowledge, the yam cropping system with “gutter-type tuber-support-container” had never been tested in the Caribbean before. Lack of local adapted cultivars can explain this observation. The introduction of cultivars from Pacific allows for creating a niche production of tubers “kabannÃ©» in Guadeloupe. First results, presented here, are indeed promising. Two original cultivars from Vanuatu, Wanorak and Nepelev, show very good performance in term of grade (tuber reaching 1 meter long) and yield (above 50 tones.ha^{-1}). This labour-intensive mode of production allows, in Guadeloupe, the harvest of graded tubers without damaging them. After all, this type of tubers, ready for processing, could be an interesting alternative for local communities for instance. But before promoting this yam-based cropping system, it is necessary to validate these first results and to complete this study by performing a complete technical-economic analysis, which is planned in 2016.

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